

REMARKS

In the final Office Action mailed May 21, 2009, the Examiner issued a restriction requirement between the composition claims (claims 1, 2, 4-9, and 18) and the process claims (claims 10-17) and withdrew claims 10-17 from consideration. The Examiner also rejected claims 1, 2, 4-9, and 18 under 35 U.S.C. § 103 as being unpatentable in view of U.S. Patent 3,615,378 to Bomberger et al. ("Bomberger").

Applicants hereby elect the composition claims (claims 1, 2, 4-9, and 18), with traverse. In view of the following remarks, Applicants respectfully request reconsideration and withdrawal of all grounds of rejection.

Restriction Requirement

The Examiner required Applicants to elect one of the following two groups of claims under 35 U.S.C. § 121:

- o Group I (claims 1, 2, 4-9, and 18) drawn to a beta titanium alloy; and
- o Group II (claim 10-17) drawn to a method for manufacturing a product produced from a beta titanium alloy.

Applicants hereby elect Group I (claims 1, 2, 4-9, and 18), with traverse. Traversal is made because the Examiner has applied the wrong set of rules (35 U.S.C. § 121 and 37 CFR § 1.141-1.146, see Office Action at pp. 2-4) to impose the restriction requirement. As the instant application is a U.S. national phase application under 35 U.S.C. § 371 to International Application No. PCT/EP2004/007201, the applicable rules should have been PCT Rule 13, unity of invention rather than 37 CFR § 1.141-146. MPEP § 1893.03(d) specifically provides: "Examiners are reminded that unity of invention (not restriction practice pursuant to 37 CFR 1.141 - 1.146) is applicable in international applications (both Chapter I and II) and in national stage applications submitted under 35 U.S.C. 371." Therefore, the Examiner has used the wrong rules to impose the restriction requirement. Accordingly, Applicants respectfully submit that the restriction requirement is improper and traverse this requirement.

Furthermore, Applicants respectfully submit that the claimed invention fulfills the PCT Rule 13, unity of invention requirement. PCT Rule 13.2 requires a technical relationship among the inventions involving one or more of the same or corresponding special technical features. Applicants submit that the technical relationship between Group I (claims 1, 2, 4-9, and 18) and Group II (claims 10-17) involves the same special technical features at least because method claim 10 is dependent upon composition claim 1 or 2 and thus includes all limitations of claim 1 or 2. Specifically, the method of claim 10 is linked to the composition of claim 1 or 2, in that the method of manufacturing includes melting a beta titanium melt having the composition of claim 1 or 2. Further, independent claims 1 and 2 are novel over the prior art for reasons discussed below. Therefore, unity of invention exists under PCT Rule 13.

For at least these reasons, Applicants respectfully submit that the restriction between Group I and Group II is improper and request that the restriction requirement be reconsidered and withdrawn. In the event that the restriction requirement is not withdrawn, Applicants elect Group I, claims 1, 2, 4-9, and 18 and withdraw claims 10-17 from consideration, with traverse.

Rejection under 35 U.S.C. § 103(a)

Claims 1, 2, 4-9, and 18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Bomberger. The Examiner asserts that the composition of the beta titanium alloy of Bomberger would overlap with the composition of the instant beta titanium alloy. See the Office Action at p. 7. The Examiner concludes that a *prima facie* case of obviousness exists and it would have been obvious to a person of ordinary skill in the art to select the claimed beta titanium alloy composition from the composition disclosed by Bomberger. See Office Action at p. 8. Applicants respectfully submit that the Office Action fails to support a *prima facie* case of obviousness because not only does Bomberger fail to teach or suggest all of the elements of Applicants' independent claims 1 and 2, but modifying the composition of Bomberger is discouraged and would render the resulting alloy unsuitable for its intended purpose.

Claims 1 and 2 are directed to a beta titanium alloy containing elements in specified mass percentages, including 13-17% vanadium in mass percent. The high vanadium content is important because it stabilizes the beta phase of the structure and increases the high temperature strength of the alloy. See p. 2, l. 26 to p. 3, l. 27 of the English Translation of the application as filed.

By contrast, Bomberger only considers titanium alloy composition in atomic percentage without disclosing any mass percentage, because Bomberger concerns the valence electron density (“VED”) of the titanium alloy which is determined by the atomic percentages of the alloy elements¹. See Bomberger at col. 3, ll. 9-11 and ll. 31-34. For example, Bomberger’s vanadium element is 4-9% in atomic percent rather than 13-17% in mass percent claimed by Applicants. See Bomberger at col. 4, l. 9 and col. 5, l. 21. One skilled in the art will appreciate that given the atomic mass of vanadium (50.942; titanium is 47.867), 4-9% in atomic percent, even if converted to mass percent², would likely be significantly lower than 13-17% in mass percent.

To further illustrate this point, Applicants have converted, from atomic to mass percent, all alloy compositions disclosed by Bomberger (i.e., in claim 3 and Tables 1-3). The converted mass percentages (i.e., weight %) are shown in Appendix A. Clearly Bomberger’s alloy compositions are different than instantly claimed; in particular, Bomberger’s vanadium content is 1.97-8.06% which does not overlap with Applicants’ 13-17%. For example, the highest vanadium mass percentage disclosed by Bomberger is 8.06% in Table 1 Alloy 11, which is substantially lower than the lowest vanadium percentage, 13% claimed by Applicants. Therefore, the composition of the beta titanium alloy of Bomberger does not overlap with the composition of Applicants’ claimed beta titanium alloy, belying the Examiner’s allegation.

Moreover, modifying the composition of Bomberger is discouraged by Bomberger. Bomberger’s objectives are “to retain an all-beta structure at room

¹ VED = $0.04(\%Ti+Zr+Sn)+0.07(\%Mn)+0.06(\%Cr+\%Mo)+0.08(\%Fe)+0.09(\%Co)+0.05(\%V+\%Cb+\%Ta)+0.03(\%Al)$. % is in atomic percentages. See Bomberger at col. 3, ll. 31-34 and Certificate of Correction.

² Converting atomic to mass percent requires knowing the alloy composition and the content of all alloy elements. $M_A = a_A X_A / (a_A X_A + a_B X_B + \dots)$, where M_A is the mass % of element A, a_A, a_B, \dots is the atomic mass of element A, B, ... and X_A, X_B, \dots is the atom % of element A, B, ...

temperature” and to achieve desired “hardness or tensile strength.” Bomberger at col. 3, ll. 9-11 and col. 4, ll. 34-37. According to Bomberger, “a necessary condition” is a certain range of VED value of the titanium alloy. *Id.* Specifically, Bomberger requires that “[o]ur alloy has a VED of 4.15 to 4.35, which we regard as critical as demonstrated hereinafter by actual examples.” Bomberger at col. 3, ll. 35-36. To obtain the desired VED values, Bomberger discloses in Tables 1-3 alloy compositions where the vanadium component is less than 8.1% (i.e., Table 1 Alloy 3) in atomic percent (8.04% in mass percent, see Appendix A). With 8.1% vanadium, Table 1 Alloy 3 has a VED of 4.35, which is regarded by Bomberger to “fall outside our invention.” See Bomberger at col. 4, ll. 30-32. Because vanadium has 5 valence electrons, one of ordinary skills in the art would understand that increasing vanadium content above 8.1% would further increase the VED value over 4.35, which is undesirable according to Bomberger. Therefore, Bomberger discourages increasing vanadium content beyond 8.1% in atomic percent (8.04% in mass percent).

Applicants respectfully submit that if the vanadium content of Bomberger’s alloy were modified and increased to 13-17% as claimed by Applicants, the corresponding VED would be greater than 4.35, thereby making the modified titanium alloy unsuitable for Bomberger’s intended purpose. That is, according to Bomberger a titanium alloy having a VED of greater than 4.35 would result in a situation where “aging produces no significant increase in their hardness or tensile strength.” Bomberger at col. 4, ll. 34-37. As the modification of Bomberger’s disclosed composition would result in an alloy unsuitable for Bomberger’s intended purposes (e.g., desired hardness or tensile strength), Applicants respectfully submit that a person of ordinary skill in the art would not have modified Bomberger’s composition to the alloy composition as claimed by Applicants. See MPEP § 2143.01, which states “If [the] proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.”

In view of the above, Applicants respectfully submit that the Examiner fails to establish a *prima facie* case of obviousness because Bomberger fails to teach or suggest each and every element of claims 1 and 2. In addition, claims 1 and 2 are patentable over

Bomberger because a person of ordinary skill in the art at the time the invention was made would be motivated not to modify Bomberger such as exceeding the disclosed vanadium content. Accordingly, Applicants respectfully request that the rejection of claims 1 and 2 under 35 U.S.C. § 103(a) be reconsidered and withdrawn. Applicants also respectfully submit that claims 4-9 and 18 are allowable because they depend upon allowable base claim 1 or 2.

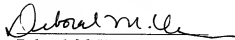
CONCLUSION

Applicants respectfully submit that all of the pending claims are in condition for allowance and requests early favorable action. If the Examiner believes a telephonic interview would expedite the prosecution of the present application, the Examiner is welcome to contact Applicants' Attorney at the number below.

Respectfully submitted,

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